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SUPPLEMENT TO AMBIENT TEMPERATURE AND VEHICLE EMISSIONS

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Office of Air and Waste Management
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16. ABSTRACT

A test program was conducted to study the effects of ambient conditions on exhaust emissions from a variety of automobiles. Twenty-six cars, ranging from 1967 models through catalytic converter-equipped prototypes and cars powered by unconventional engines (rotary, Diesel, and stratified charge), were tested at 20°, 50°, 75° and 110°F.

Test procedure was the 1975 FTP, but with engine hoods closed and cooling air flow keyed to vehicle speed. HC, CO, NOx, total aldehydes, and reactive hydrocarbons, plus carbon balance fuel economy, were measured.

From production cars and catalyst-equipped cars, '75 FTP composite emissions of all three gaseous pollutants were highest at 20°F. HC and CO were generally lowest at 75°F; composite values were greatly influenced by cold start (Bag 1) emissions. Composite NOx emissions were generally lowest at 110°F, and were relatively unaffected by ambient temperature. Fuel economy at 20°F was about 10% lower than at 110°F.

The Diesel and stratified charge cars had low emissions and little temperature sensitivity. Use of air conditioners at 110°F caused higher emissions and about 10% lower fuel economy. Reactivity of HC emissions and aldhyde emissions were unaffected by temperature and were lower from catalyst-equipped cars at all temperatures.

17. KEY WORDS AND DOCUMENT ANALYSIS

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SUPPLEMENTAL REPORT

Supplement to
AMBIENT TEMPERATURE AND VEHICLE EMISSIONS

INTRODUCTION

This report of tests on a Honda CIVIC CVCC vehicle is a supplement to the report "Ambient Temperature and Vehicle Emissions," EPA-460/3-74-028 dated October 1974. The Honda vehicle was not available to the Bartlesville Energy Research Center before the final project report was submitted to the Environmental Protection Agency (EPA).

EMISSIONS MEASUREMENTS

All test procedures, fuels, equipment, and emissions measurements were identical to those described in the above report with only the following exceptions:

(1) The Honda is a front-wheel drive vehicle and when placed in the chassis dynamometer rolls it was not possible to close the test cell doors. A curtain was used to cover the last few feet of the vehicle. As a result, the temperature of air to the vehicle (table 1) was not maintained as close to the nominal test temperatures as those of the earlier report[1/]. The maximum variation at 20° F test ambient was from 17° to 31° F with an average of approximately 24° F. At 50° F ambient tests the maximum was from 51° to 62° F with an approximate average of 54° F.

(2) Honda recommends a chassis roll spacing of from 14.5 to 17.5 inches and the roll spacing of the dynamometer used was 21 inches. However, while this could increase the tire friction load and affect the absolute emissions values it would have much less effect on the temperature comparisons.

1/ "Ambient Temperature and Vehicle Emissions," EPA-460/3-74-028, October 1974, and "Vehicle Emissions Summer to Winter," SAE Paper No. 741053.

TABLE 1. - Vehicle temperatures during tests

(Vehicle No. 77 - Honda)

Time into phase, minutes	Cold start phase temperatures, ° F				Hot start phase temperatures, ° F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
				20° F AMBIENT				
0	17	21	21	18	31	159	158	103
2	20	88	44	32	25	179	191	87
4	23	154	98	56	26	165	196	85
8.4	26	169	170	100	27	168	202	98
16	28	167	191	83				
22.9	28	171	201	73				
				50° F AMBIENT				
0	51	50	51	52	62	188	172	115
2	53	81	74	61	57	171	200	111
4	53	113	118	79	55	168	211	102
8.4	52	142	178	103	53	164	214	112
16	52	142	200	83				
22.9	52	169	207	104				
				75° F AMBIENT				
0	75	73	74	73	85	204	183	133
2	75	84	80	79	80	175	197	107
4	75	128	139	101	75	180	204	88
8.4	75	161	188	99	75	170	216	105
16	76	165	208	90				
22.9	75	177	212	100				
				110° F AMBIENT				
0	110	110	110	110	119	208	206	152
2	110	157	135	112	114	203	223	129
4	111	182	172	112	111	198	229	120
8.4	112	193	208	114	112	197	235	116
16	112	193	224	113				
22.9	111	198	229	119				

RESULTS

A summary of the data obtained is presented in the listings of table 2. To facilitate comparison with the previous report[1] and the attached figures, the averaged emissions data of this table are presented in terms of grams/test phase, grams per mile, and contribution of test phase emissions to the composite.

INFLUENCE OF TEMPERATURE ON HYDROCARBON, CARBON MONOXIDE, AND OXIDES OF NITROGEN

At the lower temperatures, the Honda demonstrated the increasing hydrocarbon (HC) and carbon monoxide (CO) emissions (figures 1 and 2) that were characteristics of previously tested cars[1] except the diesel and the PROCO stratified charge. The hot transient and cold transient phase of the test contributed a relatively large portion of the increase in HC emissions at 20° and at 110° F as shown in figure 1. A similar effect was noted for the CO emissions with the cold transinet phase contributing to the increase (figure 2). The change in oxides of nitrogen (NO_x) emissions with change in temperatures is significant with an increase in NO_x emissions occuring as the ambient temperature increases or decreases from 75° F. The stabilized phase of the test is the greatest contributor to this change in NO_x levels.

In figures 4 through 6, the composite HC, CO, and NO_x emissions data for the Honda are added to the curves taken from the previous work[1]. The levels for the three pollutants and the effects of ambient temperatures are quite comparable to the emissions averaged for the four catalyst-equipped '75 prototype vehicles. The CO emissions do not increase as greatly when temperature is reduced as did the average of the catalyst-equipped vehicles. Figure 7 shows the comparison of CO emissions to the average of the four catalyst cars, the Mazda, PROCO, and a diesel vehicle. The higher CO emissions for the Honda at the lower temperature is almost entirely the result of its CO emissions during the cold transient phase of the test.

A comparison of the HC, CO, and NO_x emissions from the Honda with those of the vehicle groups of the earlier report is shown in figures 8 through 10. The unusual behavior of the Honda giving such relatively high HC emissions in the hot transient is not understood; however, both tests yielded good replication.

The fuel economy for the 1975 CVS test and the comparison with the previous cars tested are shown in figure 11. It should be noted here that no adjustments were made to the Honda vehicle, and that the catalyst cars were prototype 1975, not production vehicles. However, the trend of fuel economy increasing with an increase in ambient temperature with some leveling off above 80° F is considered valid.

TABLE 2. - Effects of ambient temperature on emissions[1/]

(Vehicle No. 77 - Honda CIVIC, 4 dr CVCC)

	EMISSIONS											
	20° F [2/]			50° F			75° F			110° F		
	Grams/test phase	Grams/mile	Contribution to composite, g/mile	Grams/test phase	Grams/mile	Contribution to composite, g/mile	Grams/test phase	Grams/mile	Contribution to composite, g/mile	Grams/test phase	Grams/mile	Contribution to composite, g/mile
COLD TRANSIENT PHASE												
Carbon monoxide	96.9	30.0	5.56	54.2	15.10	3.11	33.8	9.42	1.94	31.9	8.9	1.83
Carbon dioxide	1940	540.3	111.2	1773	493.9	101.7	1890	526	108.4	1689	470.5	96.8
Hydrocarbon	8.9	2.48	.510	6.0	1.67	.344	2.8	.78	.161	2.33	.65	.134
Oxides of nitrogen[3/]	12.9	3.59	.740	11.2	3.12	.637	10.2	2.84	.585	10.1	2.8	.579
Total aldehydes	.308	.086	.018	.239	.067	.0137	.155	.043	.002	.096	.027	.006
Fuel used	669	186.4	38.4	595	165.7	34.1	516	171.6	35.3	551	153	31.6
STABILIZED PHASE												
Carbon monoxide	8.9	2.28	1.19	8.4	2.15	1.12	9.2	2.35	1.23	8.5	2.17	1.13
Carbon dioxide	2269	530.3	302.5	2063	532.7	277.7	2027	518	270.3	2280	583.1	304.0
Hydrocarbon	.30	.077	.040	.29	.074	.037	.37	.09	.049	.21	.05	.03
Oxides of nitrogen[3/]	11.47	2.93	1.53	8.8	2.25	1.17	7.6	1.94	1.013	11.2	2.86	1.5
Total aldehydes	.034	.009	.005	.023	.006	.003	.041	.010	.005	.011	.002	.001
Fuel used	720	184.1	96.0	670	171.4	89.3	644	165	85.9	723	185	96.4
HOT TRANSIENT PHASE												
Carbon monoxide	8.9	2.48	.68	8.2	2.28	.623	12.0	3.34	.912	18.2	5.1	1.4
Carbon dioxide	1663	454.9	95.3	1440	401.1	82.6	1579	440	89.3	1536	427.9	88.1
Hydrocarbon	10.3	2.87	.78	1.11	.31	.084	1.56	.435	.119	6.79	1.9	.52
Oxides of nitrogen[3/]	11.3	3.15	.86	8.71	2.43	.662	8.40	2.34	.638	9.9	2.8	.8
Total aldehydes	.068	.019	.004	.052	.015	.003	.058	.016	.003	.069	.019	.004
Fuel used	539	150.1	41.0	461	128.4	35.0	505	141	38.4	501	140	38
1975 CVS WEIGHTED COMPOSITE												
Carbon monoxide	55.6	7.41	---	36.4	4.85	---	30.3	4.07	---	32.3	4.3	---
Carbon dioxide	4050	540	---	3683	491	---	3742.5	499	---	3885	518	---
Hydrocarbon	9.98	1.33	---	3.53	.47	---	2.48	.33	---	5.17	.69	---
Oxides of nitrogen[3/]	23.48	3.13	---	18.38	2.45	---	16.8	2.24	---	21.15	2.82	---
Total aldehydes	.203	.027	---	.158	.021	---	.143	.019	---	.09	.012	---
Fuel economy, (1975 CVS)	1315	175	---	1189	158	---	1197	160	---	1246	166	---

1/ All results are averages of duplicate tests.
2/ Single test.
3/ NO_x corrected to 75 grains water vapor for 75° F ambient tests only.

The HC composition of the exhaust sampled for each test and each phase is shown in Appendix D, tables 1 through 23. A summary presenting the methane fraction and nonmethane fraction of the HC emissions of the Honda is shown in table 3. The proportion of methane is greater for the Honda emissions than for the noncatalyst production vehicles and less for the catalyst vehicles, and resembles closely that of the PROCO vehicle. The total nonreactive emissions of the Honda follow a similar trend, the nonreactive of the stabilized phase greater than that of the catalyst cars tested (see table 9 of the report "Ambient Temperatures and Vehicle Emissions.")

Detailed test results are provided in the attached appendices. Appendix A, tables 1 through 8 provide a listing of the emissions data for HC, CO, NO_x, carbon dioxide (CO_2), total aldehydes, and fuel consumption. Appendix B provides emission levels of HC and CO as a function of elapsed time during the test. Appendix C is a listing of time distribution rate of HC and CO emissions during the emissions test. Appendix D, tables 1 through 23 contains the HC analysis for paraffins, olefins, aromatics, and acetylenes for each bag sample for the eight tests (one sample lost).

SUMMARY

The figures and tabular material of this report are presented in form similar to those of the main report[1]. No unique differences in trends of emissions with temperatures were found for the Honda CVCC-equiped vehicle. Hydrocarbon emission levels were slightly above those reported for the PROCO (also stratified-charge engine) and CO and NO_x levels were significantly higher than the PROCO emissions. Fuel economy was lower than expected--17.6 miles per gallon as compared to expected values of approximately 25 from other investigators. A part of this lower fuel economy could result from operating under a greater than specified load as a result of tire friction on the dynamometer rolls.

Although the emission levels might be higher than normal, the effects of temperature on the levels are considered valid. Composite hydrocarbon emissions and the hot and cold transient contribution to this composite demonstrate a relatively sharp minimum in the range of 75° to 85° F. Carbon monoxide emissions demonstrate a sharp increase at the 20° F test ambient for the composite and cold start contribution. Oxides of nitrogen emissions pass through a minimum around 75° F for the composite and stabilized emissions. Fuel economy decreases slightly at the 20° F ambient but changes little from 75° to 110° F test conditions.

Table 3. HYDROCARBON REACTIVITY--VARIATION WITH AMBIENT TEMPERATURE

Test ambient.....	20° F	50° F	75° F	110° F
	Methane fraction of total hydrocarbon, wt pct			
Composite emissions.....	11	10	14	6
Cold transient phase.....	6	6	10	10
Stabilized phase.....	46	44	40	47
Hot transient phase.....	11	10	10	3
	Total non-reactive fraction of total hydrocarbon, wt pct *			
Composite emissions.....	22	22	28	15
Cold transient phase.....	17	17	24	26
Stabilized phase.....	61	60	56	65
Hot transient phase.....	23	18	20	9

* Total non-reactive hydrocarbon defined as the sum of the methane, ethane, propane, acetylene and benzene.

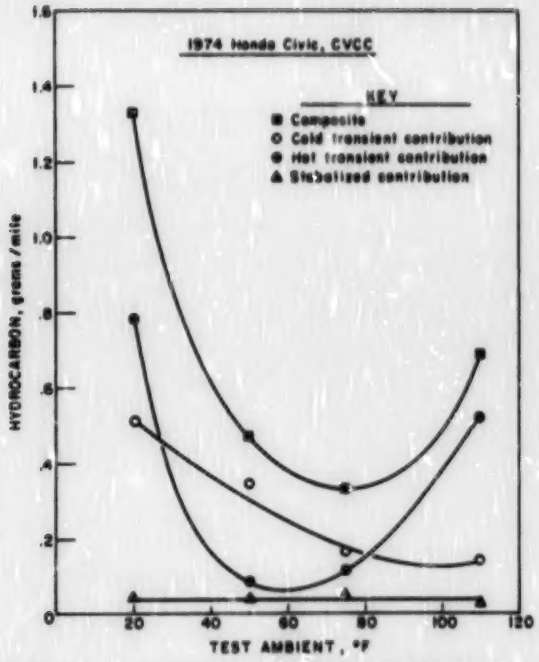

FIGURE 1. - Trends--ambient influence on emissions--hydrocarbon

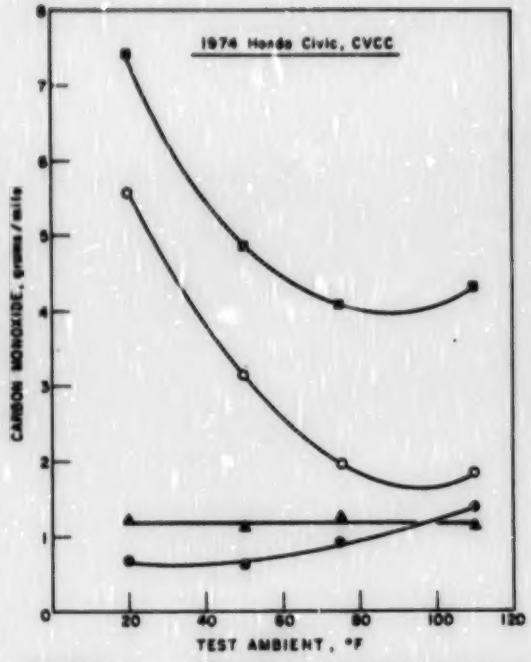

FIGURE 2. - Trends--ambient influence on emissions--carbon monoxide

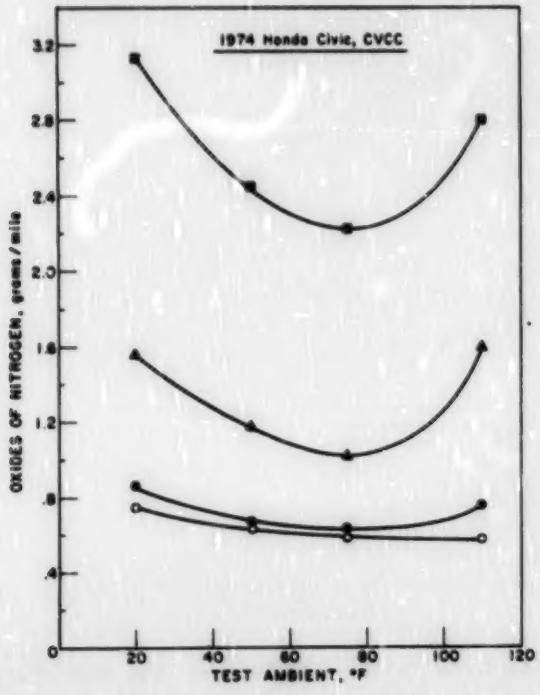

FIGURE 3. - Trends--ambient influence on emissions--oxides of nitrogen

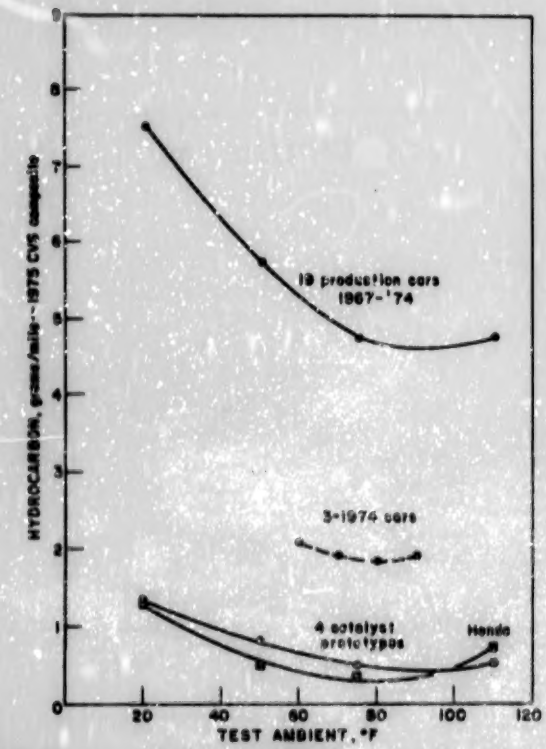

FIGURE 4. - Ambient influence and vehicle effects--hydrocarbon

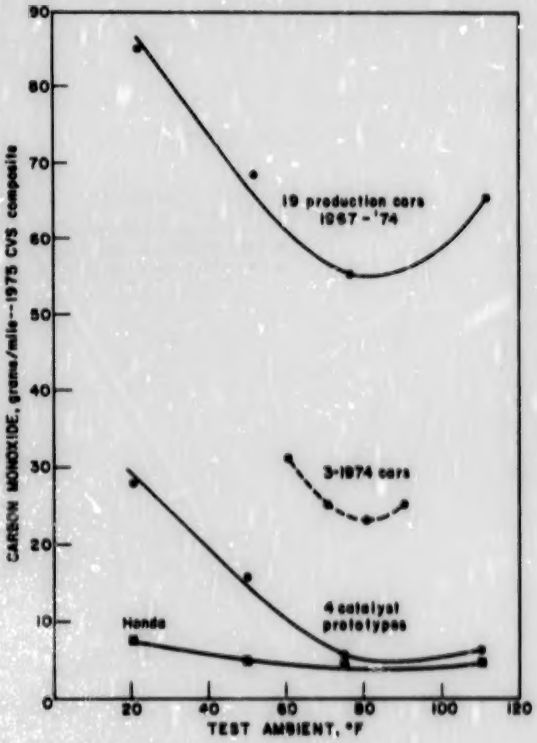

FIGURE 5. - Ambient influence and vehicle effects--carbon monoxide

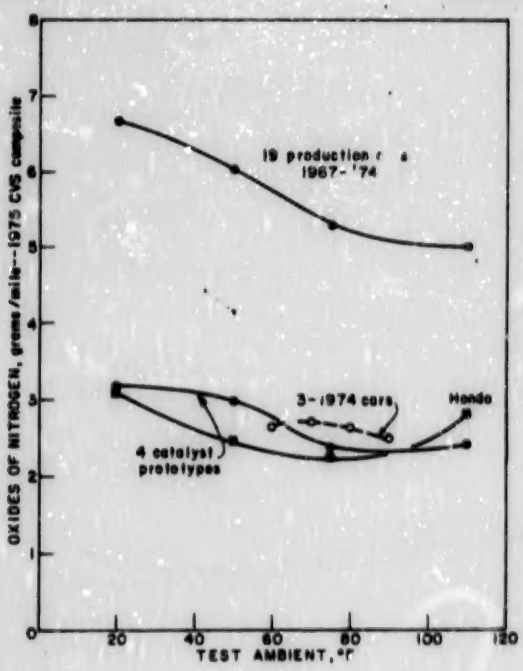

FIGURE 6. - Ambient influence and vehicle effects--oxides of nitrogen

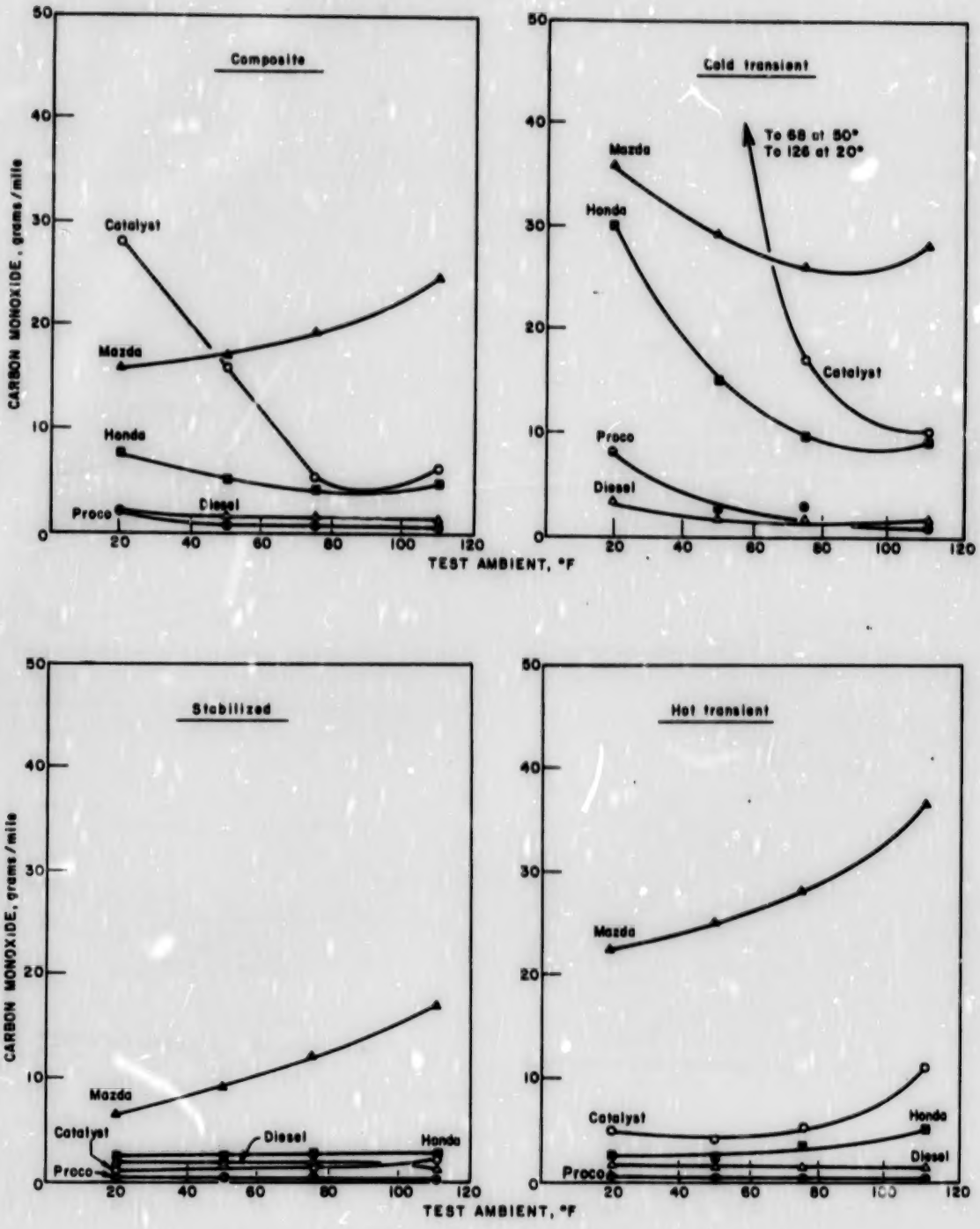

FIGURE 7. - Temperature dependence of CO emissions and influence of vehicle engine type

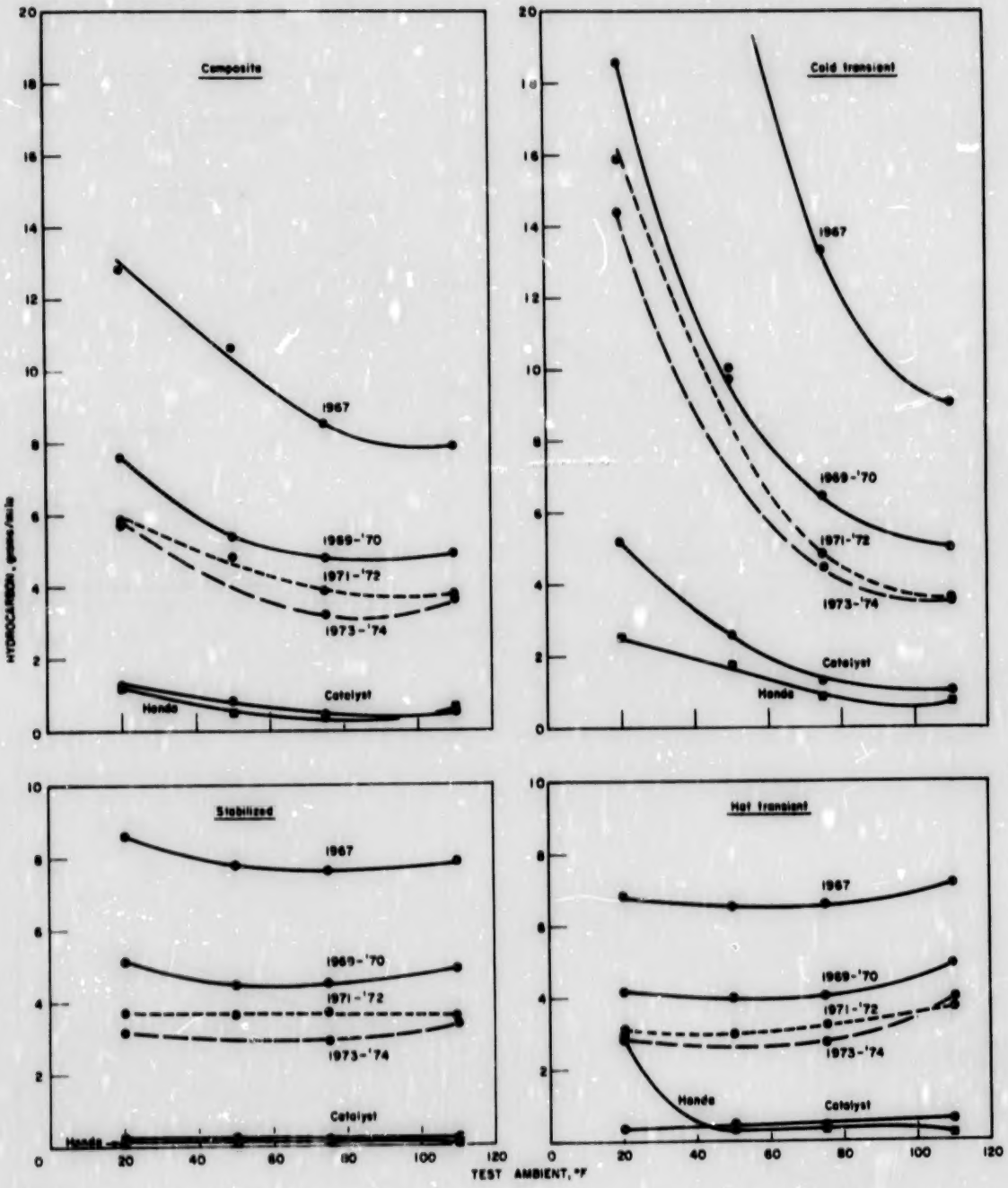

FIGURE 8. - Temperature dependence of emissions--varied categories of vehicles--hydrocarbon

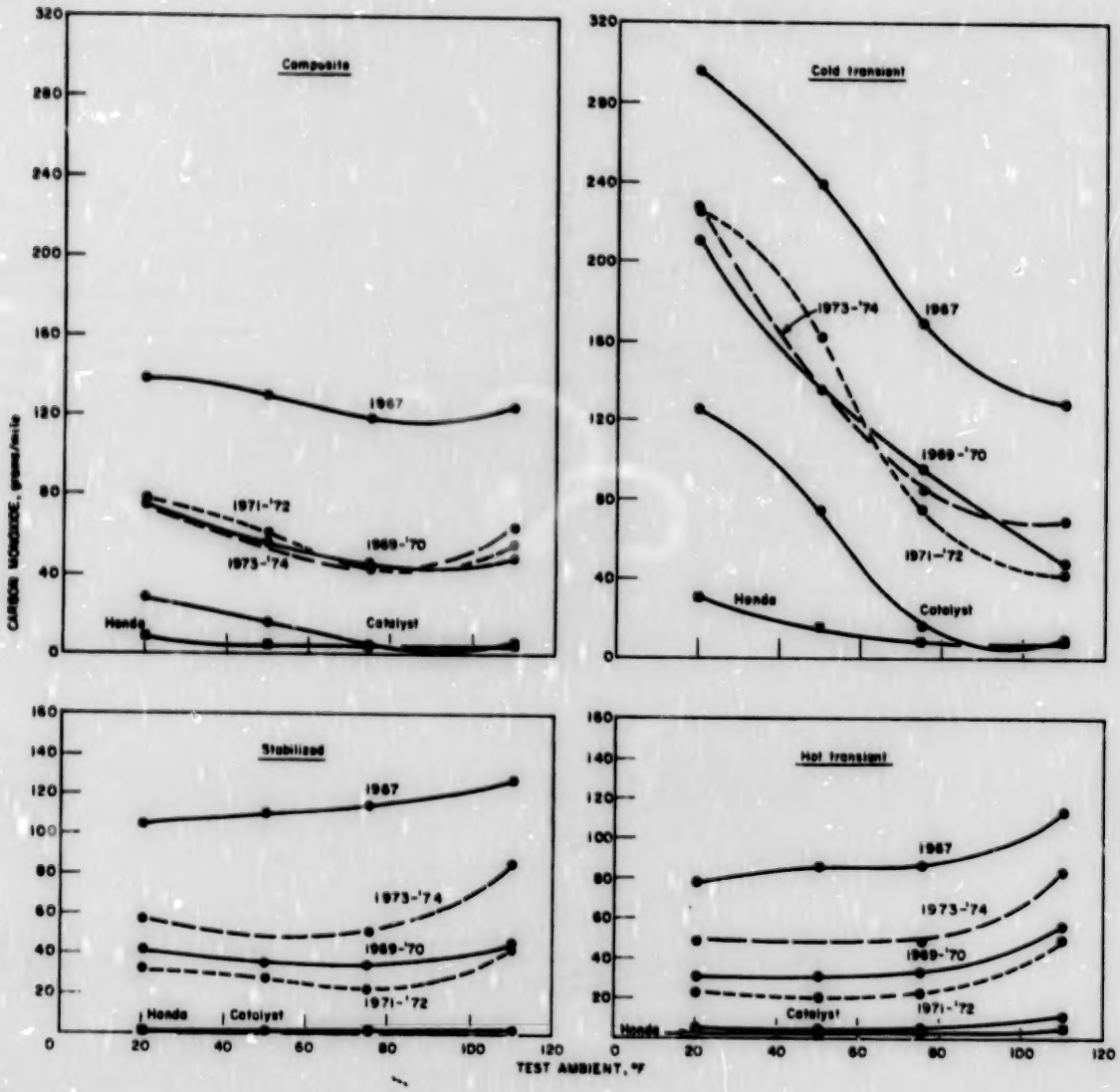

FIGURE 9. - Temperature dependence of emissions--varied categories of vehicles--carbon monoxide

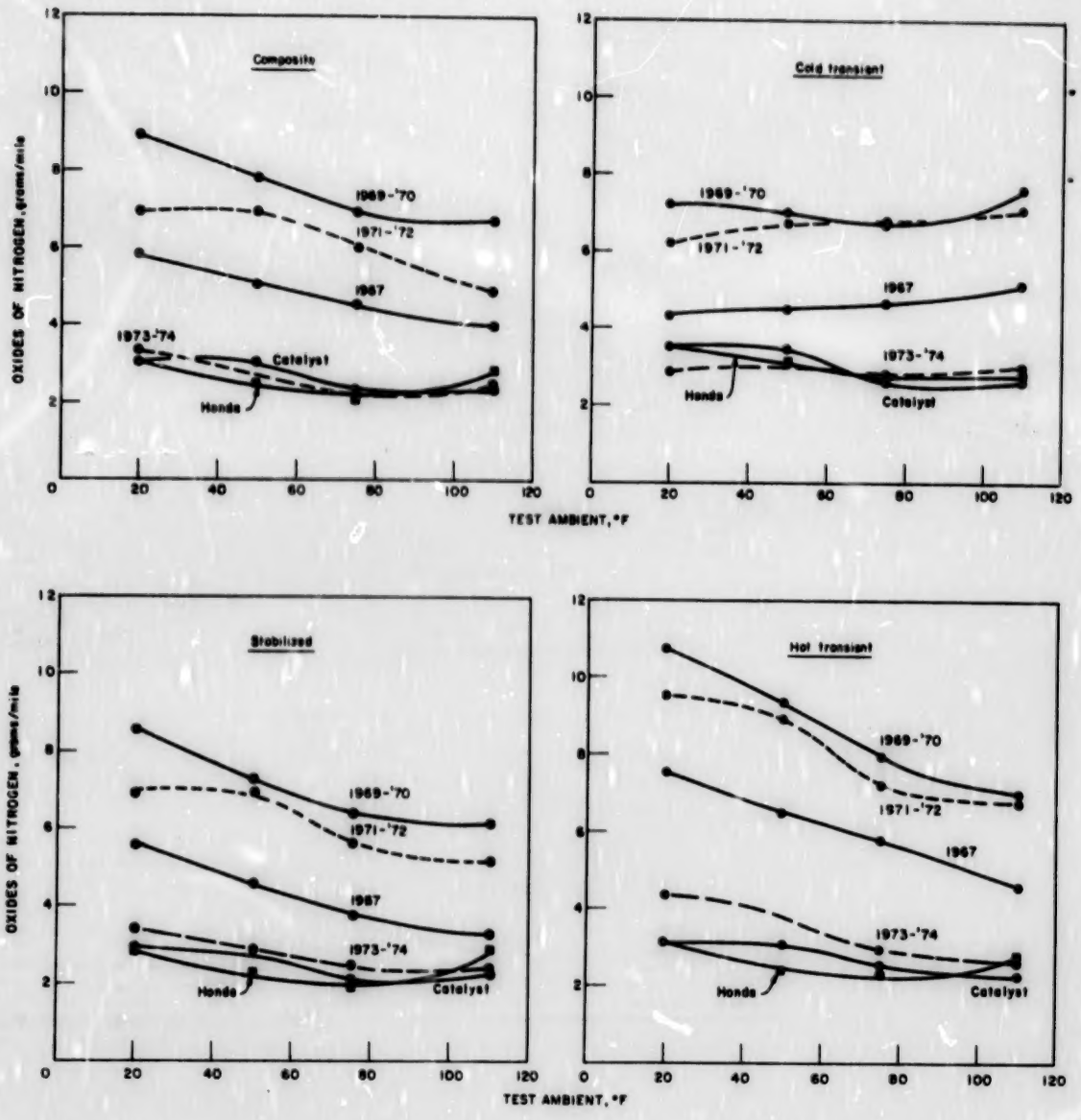

FIGURE 10. - Temperature dependence of emissions--varied categories of vehicles--oxides of nitrogen

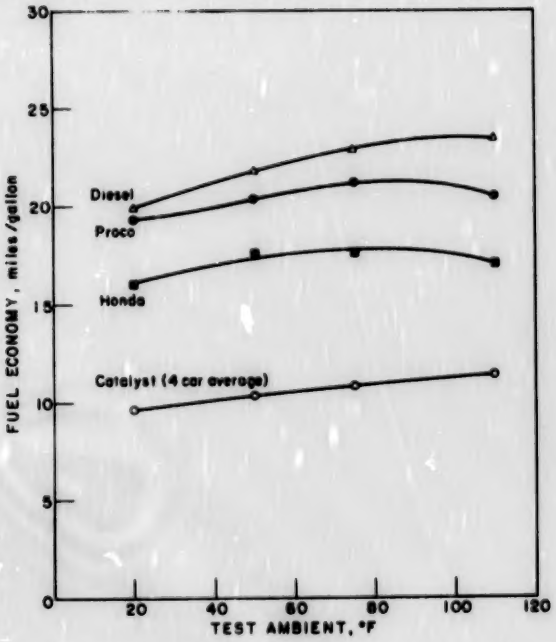

FIGURE 11. - Ambient influence and vehicle effect--fuel economy

APPENDIX A. - AMBIENT TEMPERATURE AND EMISSIONS
1975 CVS TEST PROCEDURE

1974 Honda CIVIC CVCC

RUN NO 5432 CAR NO 77 ODOMETER 0.0 DATE 11/20/74
BARON 749.4 TEMP 20F DEW PT 8F H= 9.6 GRAINS/LB
ROLL 7307 INERTIA WT 2000 DYNO LOAD 4.5HP

	BAG 1	BAG 2	BAG 3	(GRAMS/MILE) 1975 FTP	1972 FTP	BAGS 2+3
VOL (SCF/TEST)	1982.6	3283.7	1976.4			
DILUTION FACTOR	3.34	9.13	8.46			
CO (G/TEST)+	75.82	8.77	8.99	3.20	11.28	2.37
CO2 (G/TEST)	2006.07	2436.90	1538.69	563.15	596.40	538.03
HC (G/TEST)	13.90	.30	12.40	1.78	1.89	1.69
NOX (G/TEST)	14.56	12.52	10.52	3.44	3.74	3.20
NOX (G/TEST)*	11.14*	10.34*	8.04*	2.63*	2.86*	2.45*
FORM. (G/TEST)						
TOT. ALD. (G/TEST)	.364	.035	.063	.090	.053	.019
FUEL (G/TEST)	684.1	782.4	511.5	182.42	195.54	172.52
			FUEL (MI/GAL) =	15.34	14.32	16.25

+CO NOT CORRECTED FOR H2O & CO2 REMOVAL
*CORRECTED TO 75 GRAINS H2O, KH= .7649

NOTE REGARDING ABOVE TEST

Starting temperatures air to car:
Average of Bag 1 -- 18° F
Bag 2 -- 23° F
Bag 3 -- 28° F

Start problems severe -- 15 seconds of cycle at start lost.
Car would not pull load.
Choke on idle 135 seconds.
Car stumbled at 2nd acceleration (160 seconds) from idle.

TABLE A-2. - 1975 CVS Test procedure

1974 Honda CIVIC CVCC

RUN NO 5438 CAR NO 77 ODOMETER 9153.0 DATE 11/22/74
BAROM 740.0 TEMP 20F DEW PT 12F H= 11.6 GRAINS/LB
FUEL 7307 INERTIA WT 2000 DYNO LOAD 4.5HP

	BAG 1	BAG 2	BAG 3	(GRAMS/MILE) 1975 FTP	1972 FTP	BAGS 2+3
VOLM (SCF/TEST)	1895.7	5220.1	1922.6			
DILUTION FACTOR	6.21	9.79	7.80			
CO (G/TEST)+	96.85	8.87	8.91	7.41	14.10	2.37
CO2 (G/TEST)	1939.80	2268.95	1663.49	540.17	561.17	524.32
HC (G/TEST)	8.87	.30	10.33	1.33	1.22	1.42
NOX (G/TEST)	12.90	11.47	11.32	3.15	3.25	3.04
NOX (G/TEST)*	8.94*	8.84*	8.72*	2.41*	2.50*	2.34*
FORM. (G/TEST)						
TOT. ALD. (G/TEST)	.308	.034	.063	.027	.046	.014
FUEL (G/TEST)	668.6	720.1	539.2	175.32	185.15	167.91
			FUEL (MI/GAL) =	15.97	15.12	16.67

+CO NOT CORRECTED FOR H2O & CO2 REMOVAL
*CORRECTED TO 75 GRAINS H2O, KH= .7705

1974 Honda CIVIC CVCC

RUN NO 5424 CAR NO 77 ODOMETER 9070.3 DATE 11/14/74
BAROM 750.0 TEMP 50F DEW PT 30F H= 24.7 GRAINS/LB
FUEL 7307 INERTIA WT 2000 DYNO LOAD 4.5HP

	BAG 1	BAG 2	BAG 3	(GRAMS/MILE)		
VOL (SCF/TEST)	1954.0	5302.4	1958.4	1975	1972	BAGS
DILUTION FACTOR	7.20	10.75	9.33	FTP	FTP	2+3
CO (G/TEST)+	56.40	8.32	8.23	4.97	8.63	2.21
CO2 (G/TEST)	1776.71	2118.16	1440.83	493.79	519.32	174.53
HC (G/TEST)	5.66	.29	1.15	.45	.79	.19
NOX (G/TEST)	11.58	3.09	8.88	2.54	2.74	2.38
NOX (G/TEST)*	9.36*	7.27*	7.18*	2.05*	2.22*	1.93*
FORM. (G/TEST)						
TOT. ALD. (G/TEST)	.242	.023	.048	.021	.035	.010
FUEL (G/TEST)	596.7	675.4	461.7	159.36	169.62	151.62
		FUEL (MI/GAL)	=	17.44	16.38	18.33

+CO NOT CORRECTED FOR H2O & CO2 REMOVAL
*CORRECTED TO 75 GRAINS H2O, KH= .8087

TABLE A-4. - 1975 CVS Test procedure

1974 Honda CIVIC CVCC

RUN NO 5425 CAR NO 77 ODOMETER 9070.3 DATE 11/15/74
BAROM 29.3 TEMP 50F DEW PT 34F H= 29.0 GRAINS/LB
FUEL 7307 INERTIA WT 2000 DYNO LOAD 4.5HP

	BAG 1	BAG 2	BAG 3	(GRAMS/MILE)		
VOL (SCF/TEST)	2021.9	3298.1	1964.9	1975	1972	BAGS
DILUTION FACTOR	7.50	10.90	9.38	FTP	FTP	2+3
CO (G/TEST)+	52.00	8.54	8.10	4.73	8.07	2.22
CO2 (G/TEST)	1768.27	2084.70	1438.46	488.66	515.73	469.75
HC (G/TEST)	6.33	.28	1.06	.48	.88	.18
NOX (G/TEST)	10.65	8.53	7.93	2.35	2.56	2.19
NOX (G/TEST)*	8.76*	7.01*	6.52*	1.93*	2.10*	1.80*
FORM. (G/TEST)						
TOT. ALD. (G/TEST)	.236	.023	.056	.021	.035	.011
FUEL (G/TEST)	592.5	664.9	460.8	157.65	167.66	150.10
			FUEL (MI/GAL) =	17.62	16.57	18.51

+CO NOT CORRECTED FOR H2O & CO2 REMOVAL
*CORRECTED TO 75 GRAINS H2O, KH= .8223

TABLE A-5. - 1975 CVS Test procedure

1974 Honda CIVIC CVCC

AUI NO 5403 CAR NO 77 ODOMETER 3940.7 DATE 11/ 7/74
BARON 31.0 TEMP 75F DEW PT 40F H= 52.0 GRAINS/LB
FUEL 7305 INERTIA WT 2000 DYNO LOAD 4.5HP

	BAG 1	BAG 2	BAG 3	(GRAMS/MILE)		
VOLUME (SCF/TEST)	1941.1	3260.3	1940.3	1975	1972	BAGS
DILUTION FACTOR	7.00	10.74	8.05	FTP	FTP	2+3
CO (G/TEST)+	20.60	9.02	10.21	3.66	5.02	2.64
CO2 (G/TEST)	1068.59	2001.19	1610.05	511.23	527.97	498.70
HC (G/TEST)	.56	.33	1.06	.30	.51	.90
NOX (G/TEST)	11.21	8.74	9.38	2.59	2.74	2.48
NOX (G/T MT)*	10.57*	7.89*	9.07*	2.44*	2.47*	2.29*
PART. (G/TEST)						
CORR. AVG. (G/T MI)	.240	.053	.075	.027	.040	.010
FUEL (G/TEST)	603.0	664.2	527.2	161.42	169.43	158.84
			FUEL (MI/GAL) =	17.13	16.52	17.62

+CO NOT CORRECTED FOR H2O & CO2 REMOVAL
*CORRECTED TO 75 GRAINS H2O, KH= .9029

TABLE A-6. - 1975 CVS Test procedure

1974 Honda CIVIC CVCC

RUN NO 5413 CAR NO 77 ODOMETER 0.0 DATE 11/ 8/74
BAROM 747.5 TEMP 75F DEW PT 53F H= 60.7 GRAINS/LB
FUEL 7306 INERTIA WT 2000 DYNO LOAD 4.5HP

	BAG 1	BAG 2	BAG 3	(GRAMS/MILE)		
VMIX (SCF/TEST)	1973.2	3243.9	1929.6	1975	1972	BAGS
DILUTION FACTOR	6.92	11.38	8.73	FTP	FTP	2+3
CO (G/TEST)+	38.90	9.30	13.17	4.47	6.43	3.00
CO2 (G/TEST)	1911.69	1963.03	1509.55	486.07	516.63	463.01
HC (G/TEST)	2.13	.38	1.25	.27	.33	.22
NOX (G/TEST)	10.47	7.73	8.46	2.27	2.43	2.16
NOX (G/TEST)*	9.81*	7.24*	7.93*	2.13*	2.27*	2.02*
FORM. (G/TEST)						
TOT. ALD. (G/TEST)	.070	.023	.041	.010	.012	.009
FUEL (G/TEST)	624.2	623.9	483.7	155.73	166.41	147.68
		FUEL (MI/GAL) =		17.97	16.82	18.95

+CO NOT CORRECTED FOR H2O & CO2 REMOVAL
*CORRECTED TO 75 GRAINS H2O, KH= .9370

TABLE A-7. - 1975 CVS Test procedure

1974 Honda CIVIC CVCC

RUN NO 5421 CAR NO 77 ODOMETER 0.0 DATE 11/13/74
BAROM 737.8 TEMP 110F DEW PT 59F H= 76.7 GRAINS/LB
FUEL 7306 INERTIA WT 2000 DYNO LOAD 4.5HP

	BAG 1	BAG 2	BAG 3	(GRAMS/MILE) 1975 FTP	1972 FTP	BAGS 2+3
VMIX (SCF/TEST)	1898.3	3211.4	1921.1			
DILUTION FACTOR	7.75	9.58	8.36			
CO (G/TEST)+	31.92	8.36	17.16	4.25	5.37	9.40
CO2 (G/TEST)	1642.47	2312.75	1542.74	519.78	527.36	514.07
HC (G/TEST)	2.50	.24	7.71	.76	.37	1.06
NOX (G/TEST)	9.36	11.04	9.16	2.70	2.72	2.69
NOX (G/TEST)*	9.43*	11.13*	9.23*	2.73*	2.74*	2.72*
FORM. (G/TEST)						
TOT. ALD. (G/TEST)						
FUEL (G/TEST)	536.2	733.5	502.6	166.74	169.29	164.82
			FUEL (MI/GAL) =	16.79	16.53	16.98

+CO NOT CORRECTED FOR H2O & CO2 REMOVAL
*CORRECTED TO 75 GRAINS H2O, KH=1.0080

TABLE A-8. - 1975 CVS Test procedure

1974 Honda CIVIC CVCC

RUN NO 5446 CAR NO 77 ODOMETER 0.0 DATE 11/26/74
BAROM 744.5 TEMP 110F DEW PT 49F H= 52.5 GRAINS/LB
FUEL 7306 INERTIA WT 2000 DYNO LOAD 4.5HP

	BAG 1	BAG 2	BAG 3	(GRAMS/MILE) 1975 FTP	1972 FTP	BAGS 2+3
VMIX (SCF/TEST)	1931.9	3240.7	1965.1			
DILUTION FACTOR	7.49	9.96	8.63			
CO (G/TEST)+	31.85	7.48	19.96	4.34	5.24	3.66
CO2 (G/TEST)	1734.56	2246.51	1530.25	515.28	530.81	503.57
HC (G/TEST)	2.16	.18	6.07	.61	.31	.83
NOX (G/TEST)	10.86	11.28	10.64	2.94	2.95	2.92
NOX (G/TEST)*	9.82*	10.20*	9.62*	2.65*	2.67*	2.64*
FORM. (G/TEST)						
TOT. ALD. (G/TEST)	.096	.011	.069	.012	.014	.011
FUEL (G/TEST)	564.9	712.2	498.4	165.22	170.27	161.42
			FUEL (MI/GAL) =	16.94	16.44	17.34

+CO NOT CORRECTED FOR H2O & CO2 REMOVAL
*CORRECTED TO 75 GRAINS H2O, KH= .9042

APPENDIX B. - AMBIENT TEMPERATURE AND EMISSIONS CONTINUOUS DATA

1974 Honda CIVIC CVCC

TABLE B-1. - TABLE OF CONTINUOUS DATA FOR 20° F TESTS
1974 Honda CIVIC CVCC

TEST NO. 5438

TIME SEC.	COLD START CO % OF TOTAL	COLD START HC % OF TOTAL	HOT START CO % OF TOTAL	HOT START HC % OF TOTAL	COMPOSITE CO % OF TOTAL	COMPOSITE HC % OF TOTAL
137	46.8	74.4	17.2	58.0	41.4	64.5
343	44.0	20.8	25.7	30.8	40.7	26.8
505	0.8	1.5	7.3	8.4	2.0	5.7
935	4.4	1.8	25.9	1.5	8.3	1.6
1372	4.0	1.5	24.0	1.3	7.7	1.4

TABLE B-2. - TABLE OF CONTINUOUS DATA FOR 50° F TESTS
1974 Honda CIVIC CVCC

TEST NO. 5424

TIME SEC.	COLD START CO % OF TOTAL	COLD START HC % OF TOTAL	HOT START CO % OF TOTAL	HOT START HC % OF TOTAL	COMPOSITE CO % OF TOTAL	COMPOSITE HC % OF TOTAL
137	60.2	66.3	12.8	52.2	48.2	62.8
343	25.0	26.9	29.5	22.1	26.2	25.7
505	2.0	2.0	7.4	5.6	3.3	2.8
935	6.1	2.5	23.7	10.1	10.5	4.3
1372	6.8	2.4	26.6	10.0	11.8	4.3

TEST NO. 5425

TIME SEC.	COLD START CO % OF TOTAL	COLD START HC % OF TOTAL	HOT START CO % OF TOTAL	HOT START HC % OF TOTAL	COMPOSITE CO % OF TOTAL	COMPOSITE HC % OF TOTAL
137	56.5	72.9	14.6	54.8	45.3	69.1
343	27.3	20.6	25.3	16.7	26.8	19.8
505	2.0	2.2	8.8	7.6	3.8	3.4
935	6.2	2.0	22.6	9.9	10.6	3.7
1372	7.9	2.2	28.7	11.0	13.5	4.1

AVERAGE OF TEST NOS. 5424, 5425

COLD START CO % OF TOTAL	COLD START HC % OF TOTAL	HOT START CO % OF TOTAL	HOT START HC % OF TOTAL	COMPOSITE CO % OF TOTAL	COMPOSITE HC % OF TOTAL
58.4	69.8	13.7	53.5	46.8	66.1
26.1	23.6	27.4	19.5	26.5	22.6
2.0	2.1	8.1	6.5	3.6	3.1
6.1	2.2	23.1	10.0	10.6	4.0
7.3	2.3	27.7	10.5	12.6	4.2

TABLE B-3. - TABLE OF CONTINUOUS DATA FOR 75° F TESTS
1974 Honda CIVIC CVCC

TEST NO. 5408

TIME SEC.	COLD START CO % OF TOTAL	COLD START HC % OF TOTAL	HOT START CO % OF TOTAL	HOT START HC % OF TOTAL	COMPOSITE CO % OF TOTAL	COMPOSITE HC % OF TOTAL
137	43.8	75.3	14.6	58.2	31.8	67.9
343	28.0	13.4	33.7	21.7	30.4	17.0
505	4.2	2.0	6.2	3.9	5.0	2.8
935	11.1	4.5	21.1	7.8	15.2	5.9
1372	12.9	4.8	24.4	8.4	17.6	6.4

TEST NO 5413

TIME SEC.	COLD START CO % OF TOTAL	COLD START HC % OF TOTAL	HOT START CO % OF TOTAL	HOT START HC % OF TOTAL	COMPOSITE CO % OF TOTAL	COMPOSITE HC % OF TOTAL
137	59.5	71.8	14.1	46.0	42.2	59.9
343	18.5	11.2	33.9	23.7	24.4	16.9
505	2.8	1.9	10.6	7.0	5.8	4.3
935	8.5	7.0	18.2	10.7	12.2	8.7
1372	10.8	8.2	23.2	12.6	15.6	10.2

AVERAGE OF TEST NOS. 5408, 5413

COLD START CO % OF TOTAL	COLD START HC % OF TOTAL	HOT START CO % OF TOTAL	HOT START HC % OF TOTAL	COMPOSITE CO % OF TOTAL	COMPOSITE HC % OF TOTAL
52.6	73.9	14.4	53.0	37.5	64.6
22.6	12.5	33.8	22.5	27.1	17.0
3.4	2.0	8.5	5.2	5.4	3.4
9.6	5.5	19.5	9.0	13.5	7.1
11.7	6.2	23.8	10.2	16.5	7.9

TABLE B-4. - TABLE OF CONTINUOUS DATA FOR 110° F TESTS
1974 Honda CIVIC CVCC

TEST NO. 5421

TIME SEC.	COLD START CO % OF TOTAL	COLD START HC % OF TOTAL	HOT START CO % OF TOTAL	HOT START HC % OF TOTAL	COMPOSITE CO % OF TOTAL	COMPOSITE HC % OF TOTAL
137	47.0	61.0	21.9	74.1	35.5	71.4
343	26.4	24.5	38.4	18.4	31.9	19.7
505	5.9	5.8	7.0	4.5	6.4	4.7
935	10.5	4.9	16.5	1.7	13.2	2.3
1372	10.3	3.9	16.2	1.3	13.0	1.9

TEST NO. 5446

TIME SEC.	COLD START CO % OF TOTAL	COLD START HC % OF TOTAL	HOT START CO % OF TOTAL	HOT START HC % OF TOTAL	COMPOSITE CO % OF TOTAL	COMPOSITE HC % OF TOTAL
137	49.5	65.7	29.8	73.3	40.0	71.6
343	28.6	22.5	38.5	19.7	33.3	20.3
505	2.9	4.1	4.5	4.2	3.7	4.1
935	8.9	3.8	12.8	1.4	10.8	2.0
1372	10.0	3.8	14.5	1.4	12.2	2.0

AVERAGE OF TEST NOS. 5421, 5446

COLD START CO % OF TOTAL	COLD START HC % OF TOTAL	HOT START CO % OF TOTAL	HOT START HC % OF TOTAL	COMPOSITE CO % OF TOTAL	COMPOSITE HC % OF TOTAL
48.8	63.2	26.5	73.7	38.4	71.5
27.8	23.5	39.2	19.0	33.1	20.0
4.5	5.0	5.8	4.3	5.1	4.5
8.5	4.4	12.9	1.6	10.6	2.2
10.3	3.9	15.6	1.4	12.8	1.9

APPENDIX C. - TIME DISTRIBUTION

TABLE C-1. - Time distribution of emission rate during 1975 CVS test
(Vehicle No. 77, 1974 Honda CIVIC CVCC)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/				HC, relative emission rate, pct per minute			
		Ambient test temperature, ° F							
		20	50	75	110	20	50	75	110
		COLD START							
137	2.28	20.5	25.6	23.1	21.4	32.6	30.6	32.4	27.7
343	3.43	12.8	7.6	6.6	8.1	6.1	6.9	3.6	6.9
505	2.70	.3	.7	1.3	1.7	.6	.8	.7	1.9
935	7.17	.6	.9	1.3	1.2	.3	.3	.8	.6
1372	7.28	.5	1.0	1.6	1.4	.2	.3	.9	.5
		HOT START							
137	2.28	7.5	6.1	6.3	11.6	25.4	23.5	23.2	32.3
343	3.43	7.5	8.0	9.9	11.4	9.0	5.7	6.6	5.5
505	2.70	2.7	3.0	3.1	2.1	3.1	2.4	1.9	1.6
935	7.17	3.6	3.2	2.7	1.8	.2	1.4	1.3	.2
1372	7.28	3.3	3.8	3.3	2.1	.2	1.4	1.4	.2
		COMPOSITE START							
137	2.28	18.2	20.5	16.4	16.8	28.2	29.0	28.3	31.4
343	3.43	11.9	7.7	7.9	9.7	7.8	6.6	5.0	5.8
505	2.70	.7	1.3	2.0	1.9	2.1	1.1	1.3	1.7
935	7.17	1.2	1.5	1.9	1.5	.2	.6	1.0	.3
1372	7.28	1.1	1.7	2.3	1.8	.2	.6	1.1	.3

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

APPENDIX D. - HYDROCARBON COMPOSITION OF EMISSIONS

1974 Honda CIVIC CVCC

TABLE D-1. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5432 BAG 1 DATE 11/20/74
CAR 77 FUEL 7307 TEST TEMP 20F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	173.56	86.03	119.87	18.75	398.22
PPM	44.14	28.55	16.24	9.04	97.96
CARBON FRACT.	.4358	.2160	.3010	.0471	1.0000
MOLE FRACT.	.4506	.2914	.1657	.0923	1.0000
WEIGHT FRACT.	.4545	.2161	.2853	.0441	1.0000
CARBON NUMBER	3.93	3.01	7.38	2.07	4.07
MOLEC. WEIGHT	57.14	42.01	97.52	27.09	56.65

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.1752				.1752
C2	.0146	.1328		.0854	.2328
C3		.0640		.0069	.0709
C4	.0497	.0657			.1154
C5	.0869	.0189			.1058
C6	.0304	.0084	.0345		.0734
C7	.0197	.0005	.0574		.0776
C8	.0596	.0006	.0557		.1159
C9	.0099	.0005	.0118		.0222
C10	.0027	.0001	.0063		.0090
C11	.0019				.0019
TOTAL	.4506	.2914	.1657	.0923	1.0000
				TOTAL LESS CH4	.8248
			TOTAL REACTIVE* HC		.6903

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0496				.0496
C2	.0077	.0658		.0392	.1127
C3		.0474		.0049	.0523
C4	.0509	.0640			.1149
C5	.1106	.0233			.1338
C6	.0462	.0124	.0476		.1063
C7	.0348	.0009	.0934		.1291
C8	.1202	.0011	.1044		.2257
C9	.0225	.0011	.0250		.0486
C10	.0067	.0002	.0148		.0217
C11	.0052				.0052
TOTAL	.4545	.2161	.2853	.0441	1.0000
				TOTAL LESS CH4	.9504
			TOTAL REACTIVE* HC		.8558

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/22/74

NOTE COMMENTS ON EMISSIONS DATA SHEETS

TABLE D-2. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5432 BAG 2 DATE 11/20/74
CAR 77 FUEL 7307 TEST TEMP 20F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	2.08	1.09	.81	.50	4.47
PPM	1.81	.48	.11	.25	2.64
CARBON FRACT.	.4641	.2426	.1813	.1119	1.0000
MOLE FRACT.	.6845	.1805	.0404	.0947	1.0000
WEIGHT FRACT.	.5024	.2331	.1645	.0999	1.0000
CARBON NUMBER	1.15	2.27	7.60	2.00	1.69
MOLEC. WEIGHT	18.10	31.86	100.52	26.04	24.66

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.6683				.6683
C2	.0016	.1527		.0947	.2489
C3		.0119			.0119
C4	.0026	.0137			.0163
C5	.0021				.0021
C6	.0002	.0019	.0108		.0129
C7	.0005		.0084		.0089
C8	.0011		.0072		.0083
C9	.0022	.0004	.0139		.0165
C10	.0060				.0060
TOTAL	.6845	.1805	.0404	.0947	1.0000
				TOTAL LESS CH4	.3317
				TOTAL REACTIVE* HC	.2246

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.4347				.4347
C2	.0019	.1736		.0999	.2755
C3		.0203			.0203
C4	.0061	.0311			.0372
C5	.0060				.0060
C6	.0006	.0062	.0343		.0411
C7	.0019		.0315		.0334
C8	.0050		.0311		.0361
C9	.0116	.0019	.0676		.0811
C10	.0346				.0346
TOTAL	.5024	.2331	.1645	.0999	1.0000
				TOTAL LESS CH4	.5653
				TOTAL REACTIVE* HC	.4291

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/22/74

NOTE COMMENTS ON EMISSIONS DATA SHEETS

TABLE D-3. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5432 BAG 3 DATE 11/20/74
CAR 77 FUEL 7307 TEST TEMP 20F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	11.72	8.45	9.11	2.14	31.41
PPM	4.37	3.37	1.21	1.06	10.01
CARBON FRACT.	.3731	.2689	.2899	.0680	1.0000
MOLE FRACT.	.4369	.3366	.1210	.1056	1.0000
WEIGHT FRACT.	.3940	.2687	.2740	.0634	1.0000
CARBON NUMBER	2.68	2.51	7.52	2.02	3.14
MOLEC. WEIGHT	39.59	35.04	99.44	26.34	43.90

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.2844				.2844
C2	.0118	.2238		.1033	.3439
C3		.0593		.0023	.0616
C4	.0353	.0397			.0750
C5	.0335	.0058			.0393
C6	.0113	.0022	.0248		.0383
C7	.0129		.0362		.0491
C8	.0382	.0001	.0384		.0767
C9	.0056	.0004	.0153		.0213
C10	.0019	.0003	.0062		.0084
C11	.0019				.0019
TOTAL	.4369	.3366	.1210	.1056	1.0000
				TOTAL LESS CH4	.7156
			TOTAL REACTIVE* HC		.5757

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.1039				.1039
C2	.0081	.1462		.0613	.2156
C3		.0569		.0021	.0590
C4	.0468	.0498			.0966
C5	.0550	.0092			.0642
C6	.0221	.0042	.0441		.0704
C7	.0294		.0761		.1055
C8	.0994	.0002	.0929		.1925
C9	.0165	.0011	.0420		.0594
C10	.0062	.0010	.0190		.0262
C11	.0067				.0067
TOTAL	.3940	.2687	.2740	.0634	1.0000
				TOTAL LESS CH4	.8961
			TOTAL REACTIVE* HC		.7826

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/22/74

NOTE COMMENTS ON EMISSIONS DATA SHEETS

TABLE D-4. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5438 BAG 1 DATE 11/22/74
CAR 77 FUEL 7307 TEST TEMP 20F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	92.38	61.70	73.88	17.87	245.84
PPM	30.19	22.01	10.06	8.62	70.89
CARBON FRACT.	.3758	.2510	.3005	.0727	1.0000
MOLE FRACT.	.4259	.3105	.1419	.1216	.0000
WEIGHT FRACT.	.3958	.2514	.2847	.0681	.0000
CARBON NUMBER	3.06	2.60	7.34	2.07	3.47
MOLEC. WEIGHT	44.91	39.13	96.98	27.06	48.33

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.2383				.2383
C2	.0181	.1645		.1128	.2955
C3		.0709		.0089	.0798
C4	.0329	.0548			.0876
C5	.0536	.0142			.0678
C6	.0193	.0052	.0318		.0563
C7	.0130	.0002	.0483		.0615
C8	.0400	.0004	.0476		.0879
C9	.0063	.0004	.0095		.0162
C10	.0030		.0047		.0077
C11	.0014				.0014
TOTAL	.4259	.3105	.1419	.1216	1.0000
				TOTAL LESS CH4	.7617
				TOTAL REACTIVE* HC	.5989

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0791				.0791
C2	.0113	.0955		.0608	.1675
C3		.0616		.0073	.0689
C4	.0395	.0627			.1022
C5	.0800	.0204			.1003
C6	.0343	.0090	.0514		.0948
C7	.0269	.0005	.0920		.1194
C8	.0945	.0008	.1046		.1999
C9	.0168	.0009	.0236		.0413
C10	.0087		.0131		.0218
C11	.0046				.0046
TOTAL	.3958	.2514	.2847	.0681	1.0000
				TOTAL LESS CH4	.9209
				TOTAL REACTIVE* HC	.7974

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 12/ 4/74

TABLE D-5. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5438 BAG 2 DATE 11/22/74
CAR 77 FUEL 7307 TEST TEMP 20F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	1.94	1.07	.50	.56	4.08
PPM	1.83	.49	.07	.28	2.67
CARBON FRACT.	.4762	.2630	.1232	.1376	1.0000
MOLE FRACT.	.6839	.1343	.0269	.1049	1.0000
WEIGHT FRACT.	.5165	.2510	.1105	.1221	1.0000
CARBON NUMBER	1.06	2.18	7.00	2.00	1.53
MOLEC. WEIGHT	16.94	30.54	92.13	26.10	22.43

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.6720				.6720
C2	.0025	.1601		.1045	.2670
C3		.0156		.0004	.0160
C4	.0041	.0085			.0126
C5	.0026				.0026
C6	.0004	.0001	.0119		.0123
C7			.0067		.0067
C8	.0020		.0052		.0072
C9	.0002		.0027		.0029
C10			.0004		.0004
C11	.0001				.0001
TOTAL	.6839	.1343	.0269	.1049	1.0000
				TOTAL LESS CH4	.3280
			TOTAL REACTIVE* HC		.2091

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.4307				.4807
C2	.0034	.2002		.1213	.3248
C3		.0293		.0008	.0300
C4	.0105	.0212			.0317
C5	.0085				.0085
C6	.0013	.0003	.0414		.0431
C7			.0273		.0273
C8	.0102		.0247		.0349
C9	.0011		.0146		.0158
C10			.0024		.0024
C11	.0008				.0008
TOTAL	.5165	.2510	.1105	.1221	1.0000
				TOTAL LESS CH4	.5193
			TOTAL REACTIVE* HC		.3533

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 12/ 4/74

TABLE D-6. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5438 BAG 3 DATE 11/22/74
CAR 77 FUEL 7307 TEST TEMP 20F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	9.07	6.12	5.65	1.80	23.64
PPM	3.71	2.47	.89	.90	7.96
CARBON FRACT.	.3839	.2587	.2813	.0761	1.0000
MOLE FRACT.	.4655	.3101	.1114	.1130	1.0000
WEIGHT FRACT.	.4064	.2577	.2652	.0707	1.0000
CARBON NUMBER	2.45	2.48	7.50	2.00	2.97
MOLEC. WEIGHT	36.36	34.61	99.13	26.06	41.64

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.3240				.3240
C2	.0108	.2190		.1128	.3426
C3		.0462		.0002	.0464
C4	.0334	.0370			.0703
C5	.0328	.0054			.0382
C6	.0108	.0021	.0236		.0364
C7	.0112		.0326		.0439
C8	.0040	.0001	.0667		.0708
C9	.0054	.0005	.0128		.0186
C10	.0015		.0056		.0071
C11	.0017				.0017
TOTAL	.4655	.3101	.1114	.1130	1.0000
				TOTAL LESS CH4	.6760
				TOTAL REACTIVE* HC	.5288

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.1248				.1248
C2	.0078	.1475		.0705	.2258
C3		.0467		.0002	.0469
C4	.0466	.0489			.0955
C5	.0568	.0090			.0658
C6	.0222	.0041	.0443		.0707
C7	.0270		.0722		.0992
C8	.0934	.0001	.0936		.1871
C9	.0165	.0014	.0370		.0549
C10	.0050		.0181		.0230
C11	.0064				.0064
TOTAL	.4064	.2577	.2652	.0707	1.0000
				TOTAL LESS CH4	.8752
				TOTAL REACTIVE* HC	.7525

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 12/ 4/74

TABLE D-7. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5424 BAG 1 DATE 11/14/74
CAR 77 FUEL 7307 TEST TEMP 50F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	60.37	38.41	51.01	9.56	159.35
PPM	17.61	13.57	6.89	4.63	42.71
CARBON FRACT.	.3789	.2410	.3201	.0600	1.0000
MOLE FRACT.	.4124	.3177	.1614	.1085	1.0000
WEIGHT FRACT.	.3978	.2420	.3039	.0563	1.0000
CARBON NUMBER	3.43	2.83	7.40	2.06	3.73
MOLEC. WEIGHT	50.08	39.55	97.73	26.93	51.91

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.2100				.2100
C2	.0127	.1674		.1016	.2817
C3		.0709		.0069	.0778
C4	.0282	.0543			.0825
C5	.0595	.0132			.0773
C6	.0238	.0059	.0334		.0631
C7	.0159	.0004	.0553		.0716
C8	.0521	.0002	.0525		.1048
C9	.0066	.0005	.0153		.0225
C10	.0022		.0048		.0070
C11	.0015				.0015
TOTAL	.4124	.3177	.1614	.1085	1.0000
				TOTAL LESS CH4	.7900
			TOTAL REACTIVE* HC		.6422

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0649				.0649
C2	.0074	.0905		.0510	.1488
C3		.0573		.0053	.0627
C4	.0316	.0579			.0895
C5	.0826	.0244			.1069
C6	.0393	.0095	.0503		.0992
C7	.0306	.0008	.0981		.1295
C8	.1146	.0004	.1074		.2225
C9	.0164	.0011	.0355		.0531
C10	.0060		.0125		.0185
C11	.0044				.0044
TOTAL	.3978	.2420	.3039	.0563	1.0000
				TOTAL LESS CH4	.9351
			TOTAL REACTIVE* HC		.8264

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/18/74

TABLE D-8. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5424 BAG 2 DATE 11/14/74
CAR 77 FUEL 7307 TEST TEMP 50F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	1.56	1.10	.56	.47	3.69
PPM	1.39	.51	.08	.24	2.22
CARBON FRACT.	.4229	.2991	.1505	.1275	1.0000
MOLE FRACT.	.6276	.2306	.0357	.1061	1.0000
WEIGHT FRACT.	.4607	.2886	.1364	.1143	1.0000
CARBON NUMBER	1.12	2.16	7.02	2.00	1.66
MOLEC. WEIGHT	17.75	30.27	92.37	26.04	24.18

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.6123				.6123
C2	.0002	.2044		.1061	.3107
C3		.0168			.0168
C4	.0035	.0090			.0126
C5	.0042	.0002			.0044
C6	.0006		.0151		.0158
C7	.0037		.0103		.0140
C8	.0014		.0055		.0070
C9	.0012	.0002	.0039		.0053
C10	.0002		.0008		.0010
C11	.0002				.0002
TOTAL	.6276	.2306	.0357	.1061	1.0000
				TOTAL LESS CH4	.3877
				TOTAL REACTIVE* HC	.2662

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.4063				.4063
C2	.0002	.2371		.1143	.3516
C3		.0292			.0292
C4	.0085	.0208			.0293
C5	.0126	.0005			.0130
C6	.0022		.0489		.0512
C7	.0152		.0393		.0545
C8	.0067		.0243		.0310
C9	.0064	.0011	.0196		.0270
C10	.0011		.0043		.0054
C11	.0015				.0015
TOTAL	.4607	.2886	.1364	.1143	1.0000
				TOTAL LESS CH4	.5937
				TOTAL REACTIVE* HC	.4303

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/18/74

TABLE D-9. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5424 BAG 3 DATE 11/14/74
CAR 77 FUEL 7307 TEST TEMP 50F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	58.06	27.98	33.65	4.76	124.45
PPM	17.75	10.05	4.46	2.37	34.62
CARBON FRACT.	.4665	.2248	.2704	.0383	1.0000
MOLE FRACT.	.5127	.2903	.1287	.0684	1.0000
WEIGHT FRACT.	.4867	.2229	.2549	.0355	1.0000
CARBON NUMBER	3.27	2.78	7.55	2.01	3.59
MOLEC. WEIGHT	47.89	38.74	99.89	26.20	50.44

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.2605				.2605
C2	.0077	.1616		.0676	.2369
C3		.0503		.0008	.0511
C4	.0734	.0645			.1379
C5	.0744	.0091			.0835
C6	.0187	.0043	.0233		.0464
C7	.0161		.0390		.0551
C8	.0515		.0444		.0959
C9	.0063	.0004	.0159		.0226
C10	.0022	.0002	.0061		.0084
C11	.0018				.0018
TOTAL	.5127	.2903	.1287	.0684	1.0000
				TOTAL LESS CH4	.7395
			TOTAL REACTIVE* HC		.6408

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0829				.0829
C2	.0046	.0899		.0349	.1293
C3		.0419		.0006	.0426
C4	.0846	.0700			.1546
C5	.1064	.0126			.1190
C6	.0319	.0072	.0361		.0752
C7	.0320		.0712		.1031
C8	.1165		.0935		.2101
C9	.0160	.0009	.0379		.0548
C10	.0061	.0005	.0161		.0227
C11	.0057				.0057
TOTAL	.4867	.2229	.2549	.0355	1.0000
				TOTAL LESS CH4	.9171
			TOTAL REACTIVE* HC		.8415

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/18/74

TABLE D-10. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5425 BAG 1 DATE 11/15/74
CAR 77 FUEL 7307 TEST TEMP 50F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	72.50	39.55	54.60	9.49	176.14
PPM	19.71	13.88	7.38	4.60	45.57
CARBON FRACT.	.4116	.2245	.3100	.0539	1.0000
MOLE FRACT.	.4326	.3045	.1620	.1009	1.0000
WEIGHT FRACT.	.4305	.2251	.2940	.0505	1.0000
CARBON NUMBER	3.68	2.85	7.40	2.07	3.87
MOLEC. WEIGHT	53.57	39.79	97.68	26.96	53.84

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.1992				.1992
C2	.0152	.1606		.0942	.2700
C3		.0656		.0066	.0722
C4	.0315	.0521			.0836
C5	.0672	.0179			.0851
C6	.0281	.0072	.0325		.0678
C7	.0137	.0005	.0570		.0762
C8	.0602	.0002	.0533		.1137
C9	.0086	.0005	.0145		.0236
C10	.0025		.0047		.0072
C11	.0014				.0014
TOTAL	.4326	.3045	.1620	.1009	1.0000
				TOTAL LESS CH4	.8008
				TOTAL REACTIVE* HC	.6589

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0594				.0594
C2	.0085	.0837		.0456	.1377
C3		.0512		.0049	.0561
C4	.0340	.0536			.0876
C5	.0900	.0231			.1131
C6	.0449	.0112	.0471		.1032
C7	.0348	.0008	.0975		.1332
C8	.1277	.0004	.1052		.2332
C9	.0205	.0011	.0325		.0541
C10	.0066		.0117		.0182
C11	.0041				.0041
TOTAL	.4305	.2251	.2940	.0505	1.0000
				TOTAL LESS CH4	.9406
				TOTAL REACTIVE* HC	.8395

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/19/74

TABLE D-11. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5425 BAG 2 DATE 11/15/74
CAR 77 FUEL 7307 TEST TEMP 50F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	2.33	1.11	.62	.53	4.58
PPM	2.10	.50	.09	.26	2.95
CARBON FRACT.	.5079	.2412	.1356	.1154	1.0000
MOLE FRACT.	.7125	.1687	.0291	.0896	1.0000
WEIGHT FRACT.	.5469	.2296	.1215	.1020	1.0000
CARBON NUMBER	1.11	2.22	7.23	2.00	1.55
MOLEC. WEIGHT	17.55	31.11	95.41	26.04	22.86

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.6874				.6874
C2	.0116	.1411		.0896	.2423
C3		.0197			.0197
C4	.0052	.0076			.0127
C5	.0031				.0031
C6			.0105		.0105
C7	.0008	.0002	.0079		.0090
C8	.0034		.0042		.0076
C9	.0009	.0002	.0064		.0075
C10	.0001		.0000		.0002
C11	.0000				.0000
TOTAL	.7125	.1687	.0291	.0896	1.0000
				TOTAL LESS CH4	.3126
			TOTAL REACTIVE* HC		.2009

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.4823				.4823
C2	.0153	.1731		.1020	.2905
C3		.0362			.0362
C4	.0131	.0183			.0314
C5	.0098				.0098
C6			.0357		.0357
C7	.0035	.0010	.0320		.0365
C8	.0168		.0197		.0365
C9	.0050	.0010	.0338		.0398
C10	.0008		.0003		.0011
C11	.0001				.0001
TOTAL	.5469	.2296	.1215	.1020	1.0000
				TOTAL LESS CH4	.5177
			TOTAL REACTIVE* HC		.3646

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/19/74

TABLE D-12. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5425 BAG 3 DATE 11/15/74
CAR 77 FUEL 7307 TEST TEMP 50F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	12.15	6.58	7.32	1.52	27.58
PPM	4.27	2.52	.97	.76	8.52
CARBON FRACT.	.4406	.2388	.2655	.0552	1.0000
MOLE FRACT.	.5014	.2956	.1143	.0887	1.0000
WEIGHT FRACT.	.4620	.2369	.2499	.0512	1.0000
CARBON NUMBER	2.84	2.62	7.52	2.01	3.24
MOLEC. WEIGHT	41.90	36.45	99.40	26.22	45.47

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.3015				.3015
C2	.0110	.1911		.0876	.2897
C3		.0446		.0011	.0457
C4	.0539	.0487			.1026
C5	.0548	.0070			.0618
C6	.0153	.0034	.0213		.0401
C7	.0130		.0362		.0492
C8	.0421	.0001	.0384		.0806
C9	.0063	.0004	.0132		.0198
C10	.0019	.0003	.0053		.0074
C11	.0016				.0016
TOTAL	.5014	.2956	.1143	.0887	1.0000
				TOTAL LESS CH4	.6985
			TOTAL REACTIVE* HC		.5786

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.1064				.1064
C2	.0073	.1179		.0502	.1753
C3		.0413		.0010	.0423
C4	.0689	.0587			.1276
C5	.0870	.0106			.0976
C6	.0290	.0063	.0366		.0719
C7	.0286		.0733		.1019
C8	.1057	.0003	.0896		.1957
C9	.0177	.0010	.0348		.0535
C10	.0061	.0008	.0155		.0224
C11	.0055				.0055
TOTAL	.4620	.2369	.2499	.0512	1.0000
				TOTAL LESS CH4	.8936
			TOTAL REACTIVE* HC		.7996

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/19/74

TABLE D-13. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5408 BAG 1 DATE 11/ 7/74
CAR 77 FUEL 7306 TEST TEMP 75F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	34.60	27.12	28.27	7.26	97.25
PPM	11.33	9.92	3.87	3.49	28.61
CARBON FRACT.	.3558	.2789	.2907	.0747	1.0000
MOLE FRACT.	.3961	.3467	.1351	.1221	1.0000
WEIGHT FRACT.	.3748	.2798	.2754	.0700	1.0000
CARBON NUMBER	3.05	2.73	7.31	2.08	3.40
MOLEC. WEIGHT	44.82	38.23	96.53	27.14	47.37

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.2293				.2293
C2	.0134	.1964		.1124	.3222
C3		.0759		.0096	.0856
C4	.0200	.0512			.0712
C5	.0493	.0181			.0674
C6	.0213	.0042	.0297		.0553
C7	.0132	.0005	.0531		.0668
C8	.0434	.0000	.0364		.0798
C9	.0038	.0003	.0120		.0162
C10	.0013		.0038		.0051
C11	.0012				.0012
TOTAL	.3961	.3467	.1351	.1221	1.0000
				TOTAL LESS CH4	.7707
				TOTAL REACTIVE* HC	.6152

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0777				.0777
C2	.0085	.1163		.0618	.1866
C3		.0673		.0081	.0754
C4	.0245	.0601			.0847
C5	.0751	.0266			.1017
C6	.0387	.0075	.0490		.0952
C7	.0279	.0011	.1034		.1323
C8	.1046	.0001	.0816		.1863
C9	.0103	.0008	.0306		.0417
C10	.0038		.0109		.0147
C11	.0038				.0038
TOTAL	.3748	.2798	.2754	.0700	1.0000
				TOTAL LESS CH4	.9223
				TOTAL REACTIVE* HC	.8030

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/13/74

TABLE D-14. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5408 BAG 2 DATE 11/ 7/74
CAR 77 FUEL 7306 TEST TEMP 75F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	2.54	1.52	1.03	.78	5.86
PPM	2.25	.70	.14	.39	3.49
CARBON FRACT.	.4329	.2593	.1753	.1325	1.0000
MOLE FRACT.	.6460	.2016	.0414	.1111	1.0000
WEIGHT FRACT.	.4716	.2504	.1591	.1188	1.0000
CARBON NUMBER	1.13	2.16	7.12	2.00	1.68
MOLEC. WEIGHT	17.81	30.31	93.87	26.10	24.40

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.6234				.6234
C2	.0080	.1730		.1106	.2915
C3		.0257		.0005	.0262
C4	.0029	.0020			.0049
C5	.0038	.0007			.0045
C6	.0031	.0002	.0166		.0198
C7	.0015		.0112		.0127
C8	.0021		.0067		.0088
C9	.0007	.0001	.0058		.0065
C10	.0002		.0011		.0013
C11	.0003				.0003
TOTAL	.6460	.2016	.0414	.1111	1.0000
				TOTAL LESS CH4	.3766
			TOTAL REACTIVE* HC		.2415

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.4099				.4099
C2	.0099	.1989		.1180	.3267
C3		.0444		.0008	.0452
C4	.0070	.0044			.0114
C5	.0112	.0019			.0131
C6	.0108	.0007	.0530		.0645
C7	.0062		.0422		.0484
C8	.0098		.0293		.0391
C9	.0036	.0003	.0284		.0322
C10	.0011		.0062		.0073
C11	.0022				.0022
TOTAL	.4716	.2504	.1591	.1188	1.0000
				TOTAL LESS CH4	.5901
			TOTAL REACTIVE* HC		.4092

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/13/74

TABLE D-15. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5413 BAG 1 DATE 11/ 8/74
CAR 77 FUEL 7306 TEST TEMP 75F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	16.17	18.53	17.82	6.46	58.97
PPM	7.99	7.02	2.45	3.12	20.58
CARBON FRACT.	.2742	.3142	.3022	.1095	1.0000
MOLE FRACT.	.3881	.3410	.1193	.1516	1.0000
WEIGHT FRACT.	.2957	.3154	.2883	.1026	1.0000
CARBON NUMBER	2.02	2.64	7.26	2.07	2.87
MOLEC. WEIGHT	30.41	36.91	95.80	27.02	39.91

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.2966				.2966
C2	.0182	.1993		.1410	.3584
C3		.0815		.0106	.0922
C4	.0121	.0460			.0581
C5	.0221	.0123			.0344
C6	.0095	.0019	.0297		.0410
C7	.0055		.0437		.0492
C8	.0210		.0329		.0539
C9	.0013	.0001	.0110		.0124
C10	.0012		.0019		.0032
C11	.0006				.0006
TOTAL	.3881	.3410	.1193	.1516	1.0000
				TOTAL LESS CH4	.7054
				TOTAL REACTIVE* HC	.5146

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.1192				.1192
C2	.0137	.1401		.0920	.2457
C3		.0858		.0107	.0964
C4	.0176	.0643			.0819
C5	.0399	.0213			.0612
C6	.0204	.0039	.0581		.0824
C7	.0137		.1010		.1147
C8	.0602		.0875		.1477
C9	.0042	.0002	.0332		.0376
C10	.0043		.0065		.0109
C11	.0023				.0023
TOTAL	.2957	.3154	.2883	.1026	1.0000
				TOTAL LESS CH4	.8808
				TOTAL REACTIVE* HC	.7170

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/12/74

TABLE D-16. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5413 BAG 2 DATE 11/ 8/74
CAR 77 FUEL 7306 TEST TEMP 75 F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	2.02	1.86	.77	.59	5.24
PPM	1.85	.82	.11	.29	3.08
CARBON FRACT.	.3853	.3544	.1467	.1135	1.0000
MOLE FRACT.	.6017	.2673	.0367	.0943	1.0000
WEIGHT FRACT.	.4221	.3427	.1330	.1022	1.0000
CARBON NUMBER	1.09	2.26	6.81	2.05	1.70
MOLEC. WEIGHT	17.31	31.64	89.48	26.72	24.68

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.5850				.5850
C2	.0036	.2125		.0897	.3059
C3		.0412		.0046	.0458
C4	.0072	.0125			.0198
C5	.0037	.0010			.0046
C6	.0001		.0185		.0187
C7	.0007		.0099		.0106
C8	.0011		.0049		.0060
C9	.0002		.0033		.0036
TOTAL	.6017	.2673	.0367	.0943	1.0000
				TOTAL LESS CH4	.4150
				TOTAL REACTIVE* HC	.3031

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.3803				.3803
C2	.0044	.2416		.0947	.3407
C3		.0702		.0075	.0776
C4	.0171	.0283			.0453
C5	.0108	.0027			.0134
C6	.0005		.0587		.0592
C7	.0028		.0370		.0398
C8	.0051		.0210		.0262
C9	.0011		.0163		.0174
TOTAL	.4221	.3427	.1330	.1022	1.0000
				TOTAL LESS CH4	.6197
				TOTAL REACTIVE* HC	.4619

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/12/74

TABLE B-17. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5413 BAG 3 DATE 11/ 8/74
CAR 77 FUEL 7306 TEST TEMP 75F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	13.95	8.65	9.22	2.00	33.83
PPM	4.77	3.30	1.21	.98	10.26
CARBON FRACT.	.4124	.2558	.2726	.0592	1.0000
MOLE FRACT.	.4645	.3219	.1179	.0957	1.0000
WEIGHT FRACT.	.4328	.2548	.2573	.0551	1.0000
CARBON NUMBER	2.93	2.62	7.62	2.04	3.30
MOLEC. WEIGHT	43.05	36.58	100.82	26.60	46.21

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.2773				.2773
C2	.0148	.2027		.0918	.3093
C3		.0615		.0039	.0654
C4	.0357	.0431			.0788
C5	.0538	.0108			.0646
C6	.0143	.0026	.0217		.0385
C7	.0148	.0001	.0352		.0501
C8	.0410		.0356		.0767
C9	.0079	.0004	.0173		.0256
C10	.0025	.0007	.0081		.0113
C11	.0025				.0025
TOTAL	.4645	.3219	.1179	.0957	1.0000
				TOTAL LESS CH4	.7227
				TOTAL REACTIVE* HC	.5945

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0963				.0963
C2	.0096	.1231		.0517	.1844
C3		.0558		.0033	.0592
C4	.0449	.0515			.0964
C5	.0840	.0163			.1003
C6	.0266	.0046	.0366		.0679
C7	.0321	.0003	.0702		.1026
C8	.1015		.0819		.1834
C9	.0218	.0010	.0451		.0679
C10	.0077	.0022	.0235		.0334
C11	.0083				.0083
TOTAL	.4328	.2548	.2573	.0551	1.0000
				TOTAL LESS CH4	.9037
				TOTAL REACTIVE* HC	.8058

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/12/74

TABLE D-18. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5421 BAG 1 DATE 11/13/74
CAR 77 FUEL 7306 TEST TEMP 110F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	24.95	20.68	22.70	6.76	75.08
PPM	8.87	7.46	3.13	3.28	22.74
CARBON FRACT.	.3323	.2754	.3023	.0900	1.0000
MOLE FRACT.	.3902	.3281	.1375	.1442	1.0000
WEIGHT FRACT.	.3520	.2768	.2867	.0844	1.0000
CARBON NUMBER	2.81	2.77	7.26	2.06	3.30
MOLEC. WEIGHT	41.43	38.76	95.77	26.90	45.93

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.2494				.2494
C2	.0138	.1911		.1353	.3402
C3		.0679		.0089	.0768
C4	.0139	.0425			.0563
C5	.0360	.0145			.0505
C6	.0183	.0039	.0319		.0542
C7	.0059	.0079	.0538		.0676
C8	.0463		.0387		.0849
C9	.0043	.0002	.0107		.0152
C10	.0016		.0025		.0042
C11	.0008				.0008
TOTAL	.3902	.3281	.1375	.1442	1.0000
				TOTAL LESS CH4	.7506
			TOTAL REACTIVE* HC		.5695

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0871				.0871
C2	.0090	.1167		.0767	.2025
C3		.0620		.0077	.0698
C4	.0175	.0515			.0690
C5	.0564	.0219			.0784
C6	.0342	.0072	.0543		.0957
C7	.0128	.0169	.1079		.1376
C8	.1151		.0893		.2044
C9	.0121	.0005	.0279		.0405
C10	.0051		.0073		.0124
C11	.0026				.0026
TOTAL	.3520	.2768	.2867	.0844	1.0000
				TOTAL LESS CH4	.9129
			TOTAL REACTIVE* HC		.7729

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/18/74

TABLE D-19. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5421 BAG 2 DATE 11/13/74
CAR 77 FUEL 7306 TEST TEMP 110F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	1.68	.94	.89	.65	4.15
PPM	1.59	.43	.12	.32	2.46
CARBON FRACT.	.4049	.2253	.2138	.1560	1.0000
MOLE FRACT.	.6467	.1748	.0470	.1314	1.0000
WEIGHT FRACT.	.4458	.2183	.1956	.1403	1.0000
CARBON NUMBER	1.06	2.17	7.66	2.00	1.69
MOLEC. WEIGHT	16.82	30.46	101.40	26.04	24.39

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.6405				.6405
C2	.0004	.1558		.1314	.2877
C3		.0101			.0101
C4	.0010	.0084			.0094
C5	.0009				.0009
C6			.0130		.0130
C7	.0007		.0091		.0099
C8	.0007		.0059		.0066
C9	.0018	.0005	.0188		.0211
C10	.0004		.0002		.0006
C11	.0001				.0001
TOTAL	.6467	.1748	.0470	.1314	1.0000
				TOTAL LESS CH4	.3595
			TOTAL REACTIVE* HC		.2146

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.4213				.4213
C2	.0005	.1792		.1403	.3201
C3		.0175			.0175
C4	.0025	.0192			.0216
C5	.0028				.0028
C6			.0417		.0417
C7	.0030		.0344		.0375
C8	.0032		.0258		.0290
C9	.0097	.0024	.0925		.1046
C10	.0025		.0011		.0036
C11	.0004				.0004
TOTAL	.4458	.2183	.1956	.1403	1.0000
				TOTAL LESS CH4	.5787
			TOTAL REACTIVE* HC		.3962

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/18/74

TABLE D-20. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5421 BAG 3 DATE 11/13/74
CAR 77 FUEL 7306 TEST TEMP 110F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PTMC	131.37	23.67	82.43	3.58	241.05
PPM	24.07	6.41	10.84	1.76	43.08
CARBON FRACT.	.5450	.0982	.3420	.0148	1.0000
MOLE FRACT.	.5588	.1487	.2516	.0409	1.0000
WEIGHT FRACT.	.5631	.0980	.3249	.0139	1.0000
CARBON NUMBER	5.46	3.69	7.61	2.03	5.60
MOLEC. WEIGHT	78.53	51.37	100.63	26.49	77.92

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0856				.0856
C2	.0019	.0489		.0396	.0904
C3		.0169		.0013	.0182
C4	.0521	.0410			.0930
C5	.1632	.0227			.1859
C6	.0569	.0155	.0318		.1041
C7	.0413	.0013	.0915		.1341
C8	.1278	.0012	.0859		.2149
C9	.0213	.0012	.0291		.0517
C10	.0047	.0001	.0133		.0182
C11	.0040				.0040
TOTAL	.5588	.1487	.2516	.0409	1.0000
				TOTAL LESS CH4	.9144
				TOTAL REACTIVE* HC	.8412

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0176				.0176
C2	.0007	.0176		.0132	.0316
C3		.0091		.0007	.0098
C4	.0388	.0287			.0676
C5	.1510	.0204			.1714
C6	.0628	.0167	.0318		.1113
C7	.0531	.0016	.1082		.1629
C8	.1873	.0017	.1171		.3061
C9	.0351	.0020	.0449		.0820
C10	.0086	.0003	.0229		.0318
C11	.0081				.0081
TOTAL	.5631	.0980	.3249	.0139	1.0000
				TOTAL LESS CH4	.9824
				TOTAL REACTIVE* HC	.9366

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 11/18/74

TABLE D-21. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5446 BAG 1 DATE 11/26/74
CAR 77 FUEL 7306 TEST TEMP 110F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	16.31	17.68	14.17	6.16	54.31
PPM	7.77	6.86	1.98	2.98	19.59
CARBON FRACT.	.3002	.3254	.2609	.1134	1.0000
MOLE FRACT.	.3967	.3502	.1011	.1520	1.0000
WEIGHT FRACT.	.3221	.3257	.2463	.1060	1.0000
CARBON NUMBER	2.10	2.58	7.16	2.07	2.77
MOLEC. WEIGHT	31.44	36.01	94.37	27.00	38.73

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.2912				.2912
C2	.0191	.2167		.1416	.3775
C3		.0781		.0104	.0885
C4	.0178	.0438			.0617
C5	.0313	.0102			.0415
C6	.0094	.0013	.0289		.0397
C7	.0060		.0357		.0417
C8	.0200		.0284		.0484
C9	.0016	.0000	.0075		.0091
C10			.0006		.0006
C11	.0002				.0002
TOTAL	.3967	.3502	.1011	.1520	1.0000
				TOTAL LESS CH4	.7088
			TOTAL REACTIVE* HC		.5191

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.1206				.1206
C2	.0149	.1570		.0952	.2671
C3		.0846		.0107	.0953
C4	.0268	.0629			.0897
C5	.0583	.0182			.0766
C6	.0209	.0029	.0584		.0822
C7	.0155		.0849		.1004
C8	.0591		.0778		.1369
C9	.0053	.0001	.0233		.0287
C10			.0019		.0019
C11	.0007				.0007
TOTAL	.3221	.3257	.2463	.1060	1.0000
				TOTAL LESS CH4	.8794
			TOTAL REACTIVE* HC		.7109

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 12/ 4/74

TABLE D-22. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5446 BAG 2 DATE 11/26/74
CAR 77 FUEL 7306 TEST TEMP 110F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	1.55	.66	.41	.44	3.07
PPM	1.51	.31	.05	.22	2.10
CARBON FRACT.	.5062	.2160	.1348	.1430	1.0000
MOLE FRACT.	.7217	.1477	.0258	.1048	1.0000
WEIGHT FRACT.	.5481	.2050	.1208	.1261	1.0000
CARBON NUMBER	1.03	2.14	7.64	2.00	1.47
MOLEC. WEIGHT	16.43	30.02	101.15	26.04	21.64

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.7169				.7169
C2		.1337		.1048	.2384
C3		.0071			.0071
C4	.0028	.0070			.0097
C5	.0013				.0013
C6			.0084		.0084
C7			.0036		.0036
C8			.0027		.0027
C9			.0112		.0112
C10	.0007				.0007
TOTAL	.7217	.1477	.0258	.1048	1.0000
				TOTAL LESS CH4	.2831
				TOTAL REACTIVE* HC	.1700

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.5316				.5316
C2		.1733		.1261	.2994
C3		.0138			.0138
C4	.0075	.0179			.0254
C5	.0045				.0045
C6			.0304		.0304
C7			.0152		.0152
C8			.0132		.0132
C9			.0620		.0620
C10	.0046				.0046
TOTAL	.5481	.2050	.1208	.1261	1.0000
				TOTAL LESS CH4	.4684
				TOTAL REACTIVE* HC	.3120

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 12/ 4/74

TABLE D-23. - GLC Analyses
1974 Honda CIVIC CVCC

TEST NO 5446 BAG 3 DATE 11/26/74
CAR 77 FUEL 7306 TEST TEMP 110F

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
PPMC	91.32	21.01	46.84	6.09	165.26
PPM	19.94	6.24	6.24	3.01	35.44
CARBON FRACT.	.5526	.1271	.2834	.0368	1.0000
MOLE FRACT.	.5628	.1762	.1761	.0849	1.0000
WEIGHT FRACT.	.5714	.1263	.2680	.0343	1.0000
CARBON NUMBER	4.58	3.37	7.50	2.02	4.66
MOLEC. WEIGHT	66.22	46.74	99.21	26.37	65.21

MOLE FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.1488				.1488
C2	.0029	.0702		.0829	.1560
C3		.0217		.0020	.0237
C4	.0654	.0515			.1169
C5	.1699	.0192			.1891
C6	.0457	.0119	.0297		.0874
C7	.0277	.0006	.0598		.0881
C8	.0850	.0004	.0616		.1470
C9	.0124	.0003	.0180		.0312
C10	.0028	.0000	.0070		.0098
C11	.0021				.0021
TOTAL	.5628	.1762	.1761	.0849	1.0000
				TOTAL LESS CH4	.8512
				TOTAL REACTIVE* HC	.7357

WEIGHT FRACTION SUMMATIONS

	PARAFFINS	OLEFINS	AROMATICS	ACETYLENES	TOTAL
C1	.0366				.0366
C2	.0013	.0302		.0331	.0646
C3		.0140		.0012	.0152
C4	.0583	.0431			.1014
C5	.1879	.0206			.2085
C6	.0603	.0153	.0356		.1112
C7	.0425	.0010	.0845		.1280
C8	.1489	.0006	.1003		.2498
C9	.0244	.0015	.0331		.0590
C10	.0062	.0000	.0144		.0206
C11	.0051				.0051
TOTAL	.5714	.1263	.2680	.0343	1.0000
				TOTAL LESS CH4	.9634
				TOTAL REACTIVE* HC	.8934

* REACTIVE HC=TOTAL LESS (CH4+C2H6+C3H8+C2H2+C6H6)

COMPUTED 12/ 4/74